Capability Gap Brief

Mobility / Counter Mobility

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Fires and Maneuver Integration Division
0800-1000 28 February 2007

Top Ten Gap Listing

FMID Section	Priority
Unmanned Aircraft Systems	1
Assault Support	2
Target Acquisition	3
Counter fire / Targeting	4
Fire Support Coordination	5
Information Operations	6
Personal Equipment	7
Small Arms / Crew-Served	8
Mobility / Counter-Mobility	**9**
Rockets / Artillery	10
Riverine / Special Operations	11
Public Affairs	12
Offensive Air Support	13
Electronic Warfare	14
Civil Affairs	15
Offensive Anti-Air Warfare	16

Top Ten Gap Listing

- **One Gap was identified for the Mobility / Counter Mobility (M/CM) Area:**

    1. Seize & Hold Beachhead / Lodgment Area

- **The following tasks are prioritized shortfalls associated with the M/CM Area:**

    1. Conduct Maneuver
    2. Conduct Offensive Forms of Maneuver
    3. Conduct Mobility Operations
    4. Conduct Offensive Operations
    5. Conduct SASO
    6. Maintain Mobility
    7. Attack Targets
    8. Conduct Amphibious Raid
    9. Conduct MOOTW

Capability Analyzed
Mobility / Counter Mobility

16 JCA's supported: Hi Pri-Joint Access & Access Denial Ops
29 MCT's supported : Hi Pri-Conduct Maneuver

Deficiencies in Conditions: Unable to provide sufficient protected mobility platforms. Unable to provide adequate mobility (and counter mobility) in all required terrain and climatic conditions.

Deficiencies in Standards: Unable to provide survivable ground mobility (lift) for the required number of Marines.
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Inputs utilized for analysis:

- Expeditionary Armored Force (EAF) FAA, FNA, FSA and ICD
- Ground Mobility Integration Initiative Study
- STOM CONOPS
- MEFFV Alternative Concepts War Games
- EFV AoA Series
- DC, PP&O GCE Advocate's Capability List. – Jun 06
- DC, PP&O Distributed Operations Capabilities Matrix

Gap, Excess, or Shortfall

D	**S: Lack cohesive EAF doctrine**
M	**G: Lacking adequate (protected) mobility systems (OTH & sustained operations and mobility enabling engineering systems**
P	**S: Engineer organizations currently undermanned**

Current PORS

- Expeditionary Fighting Vehicle & AAV Sustainment
- Joint Light Tactical Vehicle
- Light Armored Vehicle Upgrades and Marine Personnel Carrier
- Mine Resistant Ambush Protected Vehicle
- Assault Breacher Vehicle
- Joint Assault Bridge
- Family of Construction Equipment

Impact on the MAGTF

- **This gap addresses the ground M/CM capabilities of the Marine Corps. Twenty-nine Marine Corps Tasks comprise this Capability Gap. FNA analysis identified one gap and twenty-one shortfalls.**
  - **The M/CM capability gap encompasses mobility and counter mobility capabilities for employment across the range of military operations.**
  - **Lessons from the Global War on Terrorism and recent DoD guidance point to a clear set of requirements to increase protected mobility and a greater capability and capacity to conduct engineering mobility and counter mobility tasks.**
  - **These increases are centered on the Ground Combat Element, but will have far reaching impacts across the MAGTF.**

Key Attributes Needed to Resolve the Gap

- **The Functional Needs Analysis (FNA) for the M/CM identified one task gap:**

  Seize & Hold Beachhead / Lodgment Area

- **This gap is closely related to the number one identified shortfall:**

  Conduct Maneuver

- **Recommended solutions, as presented in this brief, are aimed at closing or mitigating this gap and shortfall associated with these vital tasks.**

New or Current Capability Issues

- **The key elements of this gap center on increasing or improving upon existing capabilities and capacities resident within the MAGTF.**

- **There is no similar or duplicative capability gap being analyzed. This gap cannot collectively be folded into another effort.**

- **The M/CM capability gap is not MC unique.** We are working with the U.S. Army on Joint initiatives such as JLTV. The U.S Army has a number of initiatives that are service unique interim solutions (such as Stryker) and longer term solutions (such as Future Combat System or FCS).

- **The ability to conduct scalable protected, netted, sustained mobility to combat forces on the extended battle space will, over time provide a new capability to provide mobility to small units in close or extended battle.** This capability has been important to our ability to maneuver and fight the company and platoon, and we are growing this capability down to the fire team level.

Integration Concerns

- **Critical linkages to other Integration Divisions:**
  - Mine Resistant Ambush Protected (MRAP) is an important interim mobility solution driven by a Joint Operational Universal Need Statement that was recently transitioned to **Logistics Integration Division**.
  - Increasing mobility / counter mobility capabilities and capacities will require analysis to assess logistical impacts such as supply, maintenance, transportation and general engineer support. This effort will require support from **Logistics Integration Division** and **Sea Basing**.
  - We must integrate vehicle power systems with both **C2ID** for comms and and **LID** for offboard power generation in order to support maneuver on both the traditional and extended battlespace in order to meet the MAGTF's need to move, shoot, communicate and survive while mobile and stationary.
  - **Force Protection Integration Division** interface wrt standoff detection and neutralization of hazardous explosives (mines, IEDs, UXO), CREW and persistent ISR to predict enemy activities wrt mine/IED emplacement.

DOTMLPF Analysis

- **DOTMLPF analysis for the M/CM Gap and Shortfall Set was conducted by the following FMID Capabilities Integration Officers and will be presented as follows:**

  - **EFV---------- Mr. Collins/Mr. Dees**
  - **JLTV---------- Mr. Yunker**
  - **MPC ---------- LtCol Koch**
  - **LAV---------- LtCol Koch**
  - **AAV---------- Mr. Collings/Mr. Dees**
  - **M1A1--------- Mr. Collins/Mr. Patch**
  - **ENG ---------- Maj Clark**

- **Solutions, both materiel and non-materiel are presented in the following charts.**

Expeditionary Fighting Vehicle (EFV)

Possible DOTLPFM Impacts

- **Doctrine.**
  - **What published doctrine addresses the capability? Is the published doctrine current?**
    - Concept-based program (STOM and OMFTS) with platform-level TTPs in draft. Current doctrine of Amphibious Operations and Ship-to-Shore Movement will need to be updated to incorporate EFV Capabilities and changes in USMC and Joint publications.
    - Amphibious Force Protection and addition of Over-The-Horizon Operations will be most significant changes in publications and Doctrine.

- **Organization**
  - **Assumptions:**
    - Organizational change issues limited to adjustments within existing force structure to accommodate new capabilities.
  - **What organizational changes, if any, will eliminate or mitigate the capability gap?**
    - No organizational changes will eliminate or mitigate the capability gap.

DOTLPFM Impacts

- **Training**
  - **How could training be modified or provided to mitigate or eliminate the gap?**
    - Training can not be modified or provided to mitigate or eliminate the gap.
  - **What training requirements are identified for the fielding of new equipment?**
    - Greatest differences will be in the OTH Operations, employment of precision gunnery, and operation of the sub-systems of the platform.
  - **Who can provide the required training?**
    - A New Equipment Training Team (NETT) will provide the initial required training followed by incorporation by the Assault Amphibian school POI.
    - The NETT will be the initial trainers in preparation for IOC.
    - Training will occur at Camp Pendleton, CA.

DOTLPFM Impacts

- **Leadership and Education**
  - Leadership decisions can not mitigate gap.
  - Leadership experience/change is not required to meet or mitigate gap.
  - Organizational leadership is needed to support change as the new capabilities are fielded to fully utilize the potential of the new platform (Operations planning, employment, etc.)

- **Personnel**
  - No personnel changes can be made to eliminate gap.
  - MOS realignment can not mitigate the gap.

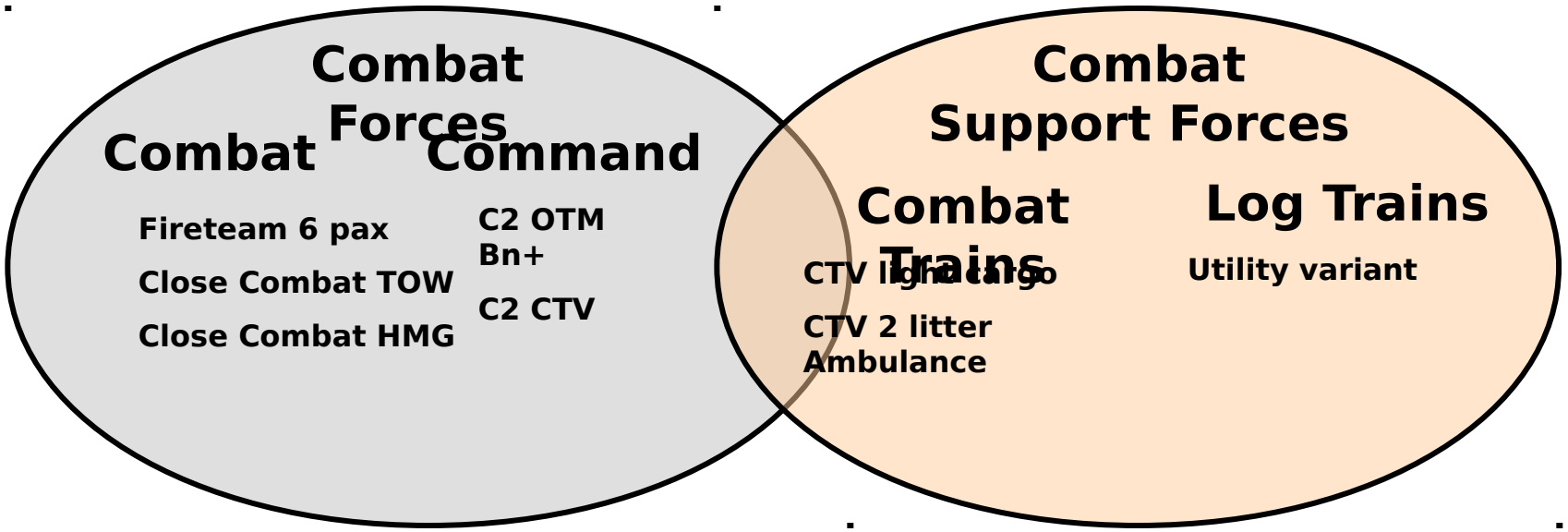
- **Facilities**
  - Maintenance and instructional facilities changes have been identified and undertaken to support EFV fielding.
  - No theater facilities requirements have been identified.

DOTLPFM Impacts

- **Materiel**
  - **Are there current materiel solutions available to mitigate the capability gap? No.**
    - There are no current materiel solutions available to mitigate the capability gap.
    - A self-deploying platform to utilize the littorals as maneuver space from 20-25 nautical miles off-shore is not available.
  - **Are there any current service/joint solutions available which meets the requested capability? No.**
    - There are no current service/joint solutions available which meet the requested capability.
    - There is no Joint interest as the EFV is designed to address the unique mission of the U. S. Marine Corps.

Joint Light Tactical Vehicle (JLTV)

Conduct Maneuver / Mobility Gap
Maneuver for GCE small units – JLTV Capabilities



DOTMLPF Impacts

- **Doctrine.**
  - **What published doctrine addresses the capability? Ground Combat Operations (MCWP3-1) and Logistics Operations (MCWP 4-1).**
    - These pubs govern employment of JLTV in support of the GCE, and the system attributes must conform to that current doctrine.
  - **Is the published doctrine current? Yes.**
    - Weights and capabilities of the JLTV will have an impact on Battalion level doctrine across the GCE and, as the system is fielded beginning in 20012, should be adjusted to accommodate capability changes.

- **Organization**
  - **Assumptions:**
    - JLTV will be employed as a replacement system for the HMMWV until full analysis ensures mobility gap is fully closed.
  - **What organizational changes, if any, will eliminate or mitigate the capability gap? None eliminate the gap. Non Materiel solutions slide will address potential mitigation.**

DOTMLPF Impacts

- **Training**
  - **How could training be modified or provided to mitigate or eliminate the gap?**
    - Training for convoy operations can assist in closing the protection gap the HMMWV exhibits. Training for comm procedures can assist in closing the C2 enabling gap. Training in maintenance awareness and fuel efficient operations can assist in closing the sustainability gap. In all cases, training alone is insufficient in closing the gap.
  - **What training requirements are identified for the fielding of new equipment?**
    - Driver licensing & operator training
    - Maintainer training
    - Mission package training for onboard systems
  - **Who can provide the required training?**
    - TECOM; MCMTS; Ft Leonard Wood; NET Teams

DOTMLPF Impacts

- **Leadership and Education**
  - **Can leadership decisions mitigate gap? No.**
  - **Can leadership experience/change is required to meet or mitigate gap? If yes explain. No.**
  - **Is organizational leadership is needed to support change? Yes.**
    - Leaders have mitigated these gaps and short falls to a limited extent or have accepted a reduced level of capability and the associated risks. Employment of a more adequately protected platform will require leadership support.

- **Personnel**
  - **Describe personnel changes which can be done to eliminate gap? No.**
  - **Can MOS realignment mitigate the gap? No.**
    - Operator and Maintainer structure for HMMWV in the GCE, CSSE, ACE, CE and Supporting Establishment is judged at this time as sufficient, however a Manpower and Training Plan for this ACAT 1 program is under development.

- **Facilities**
  - **Describe facility (include MILCON) changes required fully or partially to close the gap?**
    - The vehicles are estimated to be 20% greater in footprint than HMMWV. The systems will have removable armor panels (to provide scalable protection), therefore storage for this B Kit armor must be planned for. Facilities cost estimates are in process in conjunction with MS B preparation.
  - **Are there theater facilities required? No.**

DOTLMPF Impacts

- **Materiel**
  - **Are there current materiel solutions available to mitigate the capability gap? Yes.**
    - M1114 w/ Frag Kit 5
    - MRAP
    - Other COTS solutions being evaluated by the Evaluation Of Alternatives associated with the program.
  - **Are there any current service/joint solutions available which meets the requested capability? Yes.**
    - **This is a joint program in which the MC is participating.**
    - **Other service solutions and in fact international program solutions are being evaluated in the EOA.**
  - **Is the MC developing a solution that is independent of other services? No.**
  - **If new start describe recommended solutions.**
    - JLTV Family Vehicles and Trailers (see next slides)
  - **If recommended solution is a materiel solution describe DOTMLPF implications.**
    - **See follow on slides**

Possible materiel Solutions
Joint Light Tactical Vehicle

- **JROC approved Initial Capability Document recommendation:**

  "Based on an analysis ……, the optimal solution to provide protected, networked, and sustained mobility support is a family of Joint Light Tactical Vehicles, Wheeled Medium and Small, with compatible trailer(s)"

- **JLTV Objective:**
  - **Protected, Sustained, Networked Mobility for Joint Forces on the distributed battelfield.**

Technology Demonstrator Test & Evaluations

International Truck, Lockheed Martin Utility Vehicles
- **Product of Army funded Future Truck System ACTD**
- **Undergoing safety assessment at APG**
- **Military User Assessment planned for Mar-Apr 07**

Platform System Demonstration
- **Aug 06 at Aberdeen Proving Grounds**
- **Evaluated 14 Industry Prototypes/'Commercial Off The Shelf' Light Tactical Vehicles**

Nevada Auto Test Center Combat Tactical Vehicle
- **Designed and fabricated to JLTV CDD**
- **Test and evaluation planned for Mar-Jun 07**

Concept Candidates

3 New Designs and 14 existing vehicles assist in validating JLTV requirement goals regarding Technology Readiness– reducing Acquisition Risk

Program Status

- ICD approved by JROC 22 Nov 2006
- EoA Final Report due 28 Feb 2007
- CDD to JROC in mid May 2007
- MS B planned for Nov 2007
- Incremental Acquisition Strategy
  - Increment 1 Acquisition Objective = 5,500
  - 6 passenger Combat Tactical Variant
  - Also; C2 On-the-Move, Cargo, 2 Litter Ambu
- IOC: 2011-2012
- FOC: 2018 (est)

Possible Non Materiel Solutions

- **Non Materiel**
  - **From JLTV FSA**
    - **To improve protection in I/W when moving on MSRs, provide high level of SA by providing UAS overwatch and establish an Convoy/Movement Operations center for each convoy.**
  - **Reorganize vehicle assets to employ armored fighting vehicles for missions normally assigned to light TWVs.**

DOTMLPF Implications

- **If recommended solution is a materiel solution describe DOTMLPF implications.**
- **Doctrine.**
  - Ground Combat Operations governs employment of JLTV, and the system must conform to that current doctrine. Weights and capabilities of the JLTV will have an impact on Battalion level doctrine across the GCE and, as the system is fielded beginning in 20012, should be adjusted to accommodate capability changes.
  - The JLTV concept of employment is based on the HMMWV at this time, which largely accommodates MCO employment, though does trace to doctrinal changes of the GCE as employed in OMFTS and COIN. The Concept of Operations reflects employment in Distributed Operations. The concept of operations was developed with TRADOC, as was the OMS/MP. These documents require review by stakeholders across Combat, CS and CSS mission areas to ensure accuracy.

DOTMLPF Implications

- **Organization**
  - Organizational change issues limited to adjustments within existing force structure to accommodate new capabilities.
- **Training**
  - The current JLTV ConOp calls for a use of incidental drivers in JLTV slightly higher than HMMWV incidental drivers within the Infantry Regiments. This will call for a slightly longer training period for JLTV operators.

DOTMLPF Implications

- **Leadership and Education**
  - No significant implication.

Personnel

  - The current JLTV ConOp calls for a use of incidental drivers in JLTV slightly higher than HMMWV incidental drivers within the Inf Regiments. The personnel impact of JLTV should be negligible, though incidental driver screening may be more rigorous.

- **Facilities**
  - Already addressed.

Recommendation

- **Primary Relevant Gaps:**
  - **Conduct Maneuver, Conduct Offensive Forms of Maneuver, Conduct Offensive Operations, Conduct SASO, Conduct MOOTW**
- **Recommendation:**

Close following gaps in Maneuver/Mobility through the JLTV program:

- Develop and procure Increment 1 of JLTV, focused on GCE units (5500) between 2012 and ~2018
- Support continued R&D for Increment 2 of JLTV, focused on:
  - Improved protection at lower GVW
  - Improved fuel efficiency and power management
  - Improved scalability in armor and mission module integration
  - Future replacement of HMMWVs across the MAGTF

JLTV Capabilities Development Activities

Capability Recommendation

1. Develop and procure Increment 1 of JLTV, focused on GCE units (5500) between 2012 and ~2018
2. Support continued R&D for Increment 2 of JLTV, focused on:
   a. Improved protection at lower GVW
   b. Improved fuel efficiency and power management
   c. Improved scalability in armor and mission module integration
   d. Future replacement of HMMWVs across the MAGTF

CD&I Activity

1. Conduct the following to support 2007 MS B and SDD;
   a. System Requirements Review, T&E/TEMP planning, CPD.
   b. TO/E review for GCE, DO impact
   c. Facilities, Logistics, Manpower, & Training plans
2. Provide requirements guidance for ONR/TRADEC in S&T and R&D activities;
   a. Blast Modeling Consortium, Effects of Blast on Humans research and modeling
   b. Fuel efficiency, off-board power and generator mix/offset analysis
   c. Survivability materiels and modular designs
   d. CSS and ACE inventory analysis, strategic lift constraints analysis.

Marine Personnel Carrier (MPC)

Possible DOTLPFM Impacts

- **Doctrine.**
  - MPC is a new capability and will require the development of appropriate supporting doctrine. A well developed concept of operations and concept of employment lay the foundation for this developmental effort.
  - USMC doctrine for its existing personnel carrier, the AAV, can serve as a waypoint in the the development of MPC doctrine, but given the differences in capability a combined effort on the part of the infantry and light armor communities will need to be applied.

- **Organization**
  - MPC is a new capability therefore new company and supporting H&S structure will have to be created and realigned.
  - 202K end-strength increase realignment options.

DOTLPFM Impacts

- **Training**
  - **How could training be modified or provided to mitigate or eliminate the gap?.** The M/CM capability gap requires materiel solutions; MPC is one among several.
  - **What training requirements are identified for the fielding of new equipment?**
    - The Analysis of Alternatives will guide the selection of the final materiel solution, but assuming an LAV based platform we can expect requirements to center on increasing the training capability of SOI West, LAR & infantry battalion training, and training within the maintenance support chain.
  - **Who can provide the required training?**
    - NET can be conducted prior to IOC in 2014 and then sustained through an expansion of the existing schoolhouse structure.
    - This training can be conducted within the unit and at the LAV Crewman's and Leader's Courses at SOI West.

DOTLPFM Impacts

- **Leadership and Education**
  - **Can leadership decisions mitigate gap?** No
  - **Is leadership experience/change required to meet or mitigate gap?** No
  - **Is organizational leadership needed to support change?** Yes, this type of leadership will be required to incorporate the capabilities of the MPC into existing MAGTF structure and operations.

- **Personnel**
  - **Can MOS realignment mitigate the gap?** 202K end-strength increases in other AAV and truck companies can be realigned to provide MPC manning.

- **Facilities**
  - **Describe facility (include MILCON) changes required fully or partially to close the gap?** Additional ramp, maintenance, billeting, and office space will need to be provided.
  - **Are there theater facilities required?** No

DOTLPFM Impacts

- **Materiel**
  - **Are there current materiel solutions available to mitigate the capability gap?**
    - MPC represents a mitigating step for this gap and will provide an increase in protected expeditionary mobility capability and capacity.
  - **Are there any current service/joint solutions available which meets the requested capability?**
    - MPC is a USMC independent initiative, though the U.S. Army Stryker Program possess a degree of commonality with the USMC requirement and is therefore being considered as possible alternative (albeit one that would require significant modifications).
    - **Is the technology available?** Yes, off the shelf.

Possible Solutions
Non-Materiel/Materiel

Non-materiel / Materiel Solutions

- **The Marine Personnel Carrier Program mitigates the number one shortfall for mobility / counter-mobility – Conduct Maneuver**

- The MPC is envisioned to provide General Support lift to USMC Infantry and Light Armor Battalions.

- Supports USMC Ground Mobility Initiative and USMC response to Strategic Planning Guidance shift to Irregular Warfare.

- Requirement will be fully defined through FY07 analytical effort via AoA and CDD.

- Striving for an expeditionary platform that balances the protection, payload, and performance attributes.

- Will require the development of the appropriate supporting doctrine.

MPC Capabilities Development Activities

Capability - MPC → CD&I Activity

- **Expeditionary Armored Force ICD (3d Qtr 07)**
  - **CDTS Staffing Complete**
  - **Adjudicating Comments**
  - **KM/DS Staffing within 2 weeks**
- **Capabilities Development – IPT (Formed 1 JAN 07)**
- **CDD (1 JAN 08)**
  - **Draft COE in CDTS Staffing**
  - **Draft CONOPS**
- **AoA (1 OCT 07)**
  - **AoA IPT briefed 1 FEB 07**
  - **Revised Scope of Analysis in staffing**
  - **Study Plan under development**

Light Armored Vehicle Family of Vehicles (LAV FOV)

Possible DOTLPFM Impacts

- **Doctrine.**
  - Light Armored Reconnaissance is doctrinally governed by MCWP 3-14 Employment of the LAR Battalion. This manual is dated and is in revision to reflect the lessons learned from the GWOT.
  - Capability enhancements to the LAV FOV will require corresponding doctrinal changes. An example would be an improvement in 25mm lethality will require MCWP 3.14.1 LAV Gunnery Employ to be updated.

- **Organization**
  - **Assumptions:** Organizational change issues limited to adjustments within existing force structure.
  - **There are no organizational changes that will eliminate or mitigate the capability gap?** No

DOTLPFM Impacts

- **Training**
  - Training has been modified to mitigate the survivability aspects of this gap. Additionally, JUONS driven fielding of MRAP vehicles and the use of the more survivable MTVR are being utilized.
  - **What training requirements are identified for the fielding of new equipment?** Anti-Armor, and Mortar Gunnery training will all be impacted by the proposed materiel solutions.
  - **Who can provide the required training?** All training requirements associated with materiel solutions can be accounted for by adjusting existing school house and unit level plans of instruction.

DOTLPFM Impacts

- **Leadership and Education**
  - Leaders have mitigated these gaps and short falls to a limited extent or have accepted a reduced level of capability and the associated risks.

- **Personnel**
  - No additional structure or significant organizational changes required.

- **Facilities**
  - No additional CONUS, OCONUS, or theater specific facilities required.

DOTLPFM Impacts

- **Materiel**
  - **Are there current materiel solutions available to mitigate the capability gap?**

- LAV FOV Survivability Product Improvement Program

- LAV Indirect Fire Upgrade

- LAV Heavy Anti-Armor Weapon Modernization

- LAV C2 Upgrade

- LAV 25mm Depleted Uranium Upgrade

Possible Solutions
Non-Materiel/Materiel

Materiel Solutions

- **LAV FOV Survivability Product Improvement Program (PIP) mitigates several shortfalls for mobility / counter-mobility – to include Conduct Maneuver.**

- The LAV FOV is approximately 25 years old. Underbody armor is designed to protect against hand-grenades and anti-personnel mines.

- Current operations have proven the vulnerability of this level of protection and render the LAV FOV less effective.

- This PIP would serve to modernize the LAV FOV and markedly increase it's survivability. It would include:

  - Fuel Tank Relocation and Protection Packages
  - Mine Protection Package – Internal and External
  - Power train and suspension modifications

Possible Solutions
Non-Materiel/Materiel

Materiel Solutions

- **LAV Indirect Fire Upgrade mitigates the Attack Targets and Conduct Direct Fire shortfalls for mobility / counter-mobility.**

- This upgrade would utilize the existing LAV-M platform and modify it to accept a larger caliber mortar system.

- The LAV-M utilizes the M252 81mm mortar system mounted on an internal turn-table. This system did not meet unit operational requirements at the time of fielding. It lacks the range and lethality demanded by light armor operations.

- The LAV Indirect Fire Upgrade seeks to correct this shortfall and provide the increased range and lethality required.

- With the fielding of EFSS an opportunity exists to apply an existing USMC solution to this short fall. The 120mm possesses the range and lethality required, is in the USMC system, and represents a viable alternative to meet this shortfall.

- There are 62 LAV-M systems in the USMC inventory.

Possible Solutions
Non-Materiel/Materiel

Materiel Solutions

- **LAV Heavy Anti-Armor Weapon Modernization mitigates the Attack Targets and Conduct Direct Fire shortfalls for mobility / counter-mobility.**

- This upgrade would utilize the existing LAV-AT platform and modify it to accept a the next generation TOW system.

- The LAV-AT utilizes the M220 TOW system mounted on the Emerson 901TOW turret. The M220 is being replace by the SABRE system and is not compatible with the Emerson 901 TOW turret.

- The Emerson 901 TOW turret is no longer in production and represents 1960's technology utilized to meet a U.S. Army requirement. It has not held up well in the maritime environment and is no longer deployed with MEUs or currently in theater.

- The LAV Anti-Armor Weapon Modernization seeks to correct these shortfalls and account for impending obsolescence issues. This initiative would utilize and analysis of alternative to arrive an acceptable materiel solution.

Possible Solutions
Non-Materiel/Materiel

Materiel Solutions

- **LAV 25mm Depleted Uranium Upgrade (DU) mitigates the Attack Targets and Conduct Direct Fire shortfalls for mobility / counter-mobility.**

- The LAV-25 Depleted Uranium Upgrade seeks to improve the lethality of the legacy system and increase its effectiveness against a range of armored threats and emerging up-armoring packages.

- This upgrade would utilize the existing LAV-25 platform and its M242 25mm Chain Gun and modify it to accept the 25mm deplete uranium round.

- The LAV-25 target acquisition system would require modification in order to handle the ballistic specifications for this particular ammunition type.

- The 25mm DU ammunition would also have to be procured.

- 25mm DU is in service with U.S. Army Bradley IFV equipped units.

- There are 477 LAV-25 systems in the USMC inventory.

Possible Solutions
Non-Materiel/Materiel

Materiel Solutions

- **LAV-C2 Upgrade mitigates several shortfalls for mobility / counter-mobility – to include Conduct Maneuver.**

- The LAV-C2 has been incrementally product improved over the last 25 years to keep its command and control suite current and compatible with the rest of the MAGTF.

- This Upgrade would serve to comprehensively modernize the LAV-C2 and markedly improve it's effectiveness. It includes improvements in:

  - Intercom System, Work Stations, power distribution & management

  - HF and Satellite on-the-move capabilities

  - SA & Fire Support Systems

- There are 55 LAV-C2 systems in the USMC inventory.

Engineer Capabilities Development Activities

Capability	CD&I Activity
1. LAV FOV Survivability PIP	• Expeditionary Armored Force ICD (3d Qtr 07) – A, B, and limited C Kits funded via supplemental funding – D Kits and round-out C Kits plus spares are required
2. LAV Indirect Fire Upgrade	• Expeditionary Armored Force ICD (3d Qtr 07) • CDD and AoA efforts are next steps
3. LAV Heavy Anti-Armor Modernization	• Expeditionary Armored Force ICD (3d Qtr 07) • CDD and AoA efforts are next steps
4. LAV-25 Depleted Uranium Upgrade	• Under way and funded via supplementals as part of the LAV A2 PIP
5. LAV-C2 Upgrade	• CPD is in development - CDTS staffing is complete - Comments are in adjudication - KM/DS staffing w/in 30 Days

Possible Solutions
Non-Materiel/Materiel

Non-materiel Solutions

- Light Armor Doctrine requires update to account for lesson learned and changes in TTPs resulting from operations in the Global War on Terrorism.

- Materiel changes also demand an update to this body of doctrine to include:

  - Fielding of the Improved Thermal Sight System

  - Modifications resulting from the LAV A2 Upgrade

- Testing is required to validate the LAV FOV ability to conduct swim operations in light of the LAV A2 Upgrade. The swim capability has been suspended pending PM-LAV directed testing.

Assault Amphibious Vehicle (AAV)

Possible DOTLPFM Impacts

- **Doctrine.**
  - **What published doctrine addresses the capability? Is the published doctrine current?**
    - The currently published doctrine governing the employment of AAVs is the MCWP 3-13 published in 2003.
    - Doctrinal changes which may result from new/enhanced capabilities will be associated with gunnery (esp. during darkness).

- **Organization**
  - **Assumptions:**
    - Organizational change issues limited to adjustments within existing force structure to accommodate new capabilities.
  - **What organizational changes, if any, will eliminate or mitigate the capability gap?**
    - No organizational changes will eliminate or mitigate the capability gap.

DOTLPFM Impacts

- **Training**
  - **How could training be modified or provided to mitigate or eliminate the gap?.**
    - Training can not be modified or provided to mitigate or eliminate the gap.
  - **What training requirements are identified for the fielding of new equipment?**
    - Training requirements identified for the fielding of new thermal sight will include employment, target identification and maintenance.
  - **Who can provide the required training?**
    - The required training will be provided via a New Equipment Training Team and formal school.
    - Training will be provided when system fielded.
    - Training will be conducted at using unit sites (including in theater) and school.

DOTLPFM Impacts

- **Leadership and Education**
  - **Can leadership decisions mitigate gap?** No.
  - **Is leadership experience/change required to meet or mitigate gap?** No.
  - **Is organizational leadership needed to support change?** No.

Personnel

- **Can MOS realignment mitigate the gap?** No.

- **Facilities**
  - **Describe facility (include MILCON) changes required fully or partially to close the gap?** None.
  - **Are there theater facilities required?** No.

DOTLPFM Impacts

- **Materiel**
  - **Are there current materiel solutions available to mitigate the capability gap?**
    - There are several COTS and NDI thermal sight solutions which may meet the requirement and are being considered at this time.
  - **Are there any current service/joint solutions available which meets the requested capability?**
    - The MC is not reviewing another service's program.
    - The MC is reviewing COTS and NDI solutions independent of other services.

AAV Improvement/Sustainment Considerations

- **Thermal Sight (current program)**
  - **Provides night/reduced visibility weapon capability (AAV ROC)**
- **Command variant communications suite upgrade**
  - **Provides relevant command and control capability**
- **Survivability**
  - **IED blast protection/mitigation**
  - **RPG protection/mitigation (AAV ROC)**
- **Direct Fire/Precision Gunnery**
  - **Addresses shortfall EFV intended to fill (AAV ROC)**

AAV Capabilities Development Activities

Capability

- **Thermal Sight (POR)**
- **Command variant communications suite upgrade**
- **Survivability (POR)**
- **Direct Fire/Precision Gunnery (BAE IR&D)**

CD&I Activity

- **UUNS**
  - **Vendor down-select ongoing (protest)**
  - **MS C Decision March 12th**
  - **Fielding begin 4th Qtr FY 07 (up to 1,026 systems)**
- **Shortfall (Supplemental funding)**
  - **Guidance via MCCDC letter**
  - **Intent to utilize EFV suite less viable than initially briefed. Other options being considered.**
  - **Recommendation/Decision 2nd Qtr 07**
- **UUNS (MCTAGS)**
  - **Contract awarded 1st Qtr 07**
  - **Vehicle fit-up March 07**
  - **Fielding 4th Qtr?**
- **CDD (if desired)**
  - **DOTMLPF impacts**
  - **Cost**
  - **Schedule TBD**

Tank (M1A1)

Possible DOTLPFM Impacts

- **Doctrine.**
  - **What published doctrine addresses the capability? Is the published doctrine current?**
    - The MCWP 3-12 is the published doctrine which addresses the capability. This doctrine is current and was published in 2005.
    - No doctrinal changes result from new/enhanced capabilities being introduced to mitigate this gap.

- **Organization**
  - **Assumptions:**
    - Organizational change issues limited to adjustments within existing force structure to accommodate new capabilities.
  - **What organizational changes, if any, will eliminate or mitigate the capability gap?**
    - None

DOTLPFM Impacts

- **Training**
  - **How could training be modified or provided to mitigate or eliminate the gap?**
    - Training can not be modified or provided to mitigate or eliminate the gap.
  - **What training requirements are identified for the fielding of new equipment?**
    - Training requirements identified for the fielding of new equipment are human factors and instrumentation related.
  - **Who can provide the required training?**
    - The required training will be provided as part of the regular training programs.
    - This training will occur as fielded.
    - Training will take place at formal school and using units.

DOTLPFM Impacts

- **Leadership and Education**
  - Leadership decisions can not mitigate gap.
  - Leadership experience/change is not required to meet or mitigate gap.
  - Organizational leadership is not needed to support change.

- **Personnel**
  - No personnel changes can be made to eliminate gap.
  - MOS realignment can not mitigate the gap.

- **Facilities**
  - No facility changes are required to fully or partially close the gap.
  - Updates to training devices required.
  - No theater facilities required.

DOTLPFM Impacts

- **Materiel**
  - **Are there are current materiel solutions available to mitigate the capability gap? Yes.**
    - The Firepower Enhancement Program incorporates several target acquisition issues and includes a 2nd generation thermal sight and directional turret indicator.
  - **Are there are current service/joint solutions available which meets the requested capability but are more expensive for little improvement in capability? No.**
    - The MC is not participating in another service's program.
    - The MC has developed a solution that is independent of other services.

Tank Improvement/Sustainment Considerations

- **Firepower Enhancement Program (FEP) – Ongoing program**
  - Wide array of improvements which increases distance at which targets can be acquired and discriminated as well as to provide for location of those targets
  - UUNS currently in system identifying need for High Explosive/Fragmenting round
- **Thermal sight on TC .50 cal**
  - Night/reduced visibility and remote operation
- **Blade tanks (1/4)**
  - Capability to produce breaches and clear obstacles
- **Rear-facing camera**
  - Provides S/A to crew
- **Remote weapon for loader**
  - Under-armor solution
- **Fans and shades**
  - Human factors issue intended to reduce interior heat in desert ops
- **Exterior Auxillary Power Unit**
  - Efforts to increase capability and reliability and decrease noise

Tank Improvement/Sustainment Considerations (cont.)

- **Tank Systems Improvement Reliability and Sustainability (TISRS)**
  - **Replaces unsupportable legacy hardware with new networking and power management components as well as an upgraded ballistic computer required to support additional rounds.**
  - **Includes imbedded diagnostics**
- **Expected to be bought out before POM 10 starts.**

Tank Capabilities Development Activities

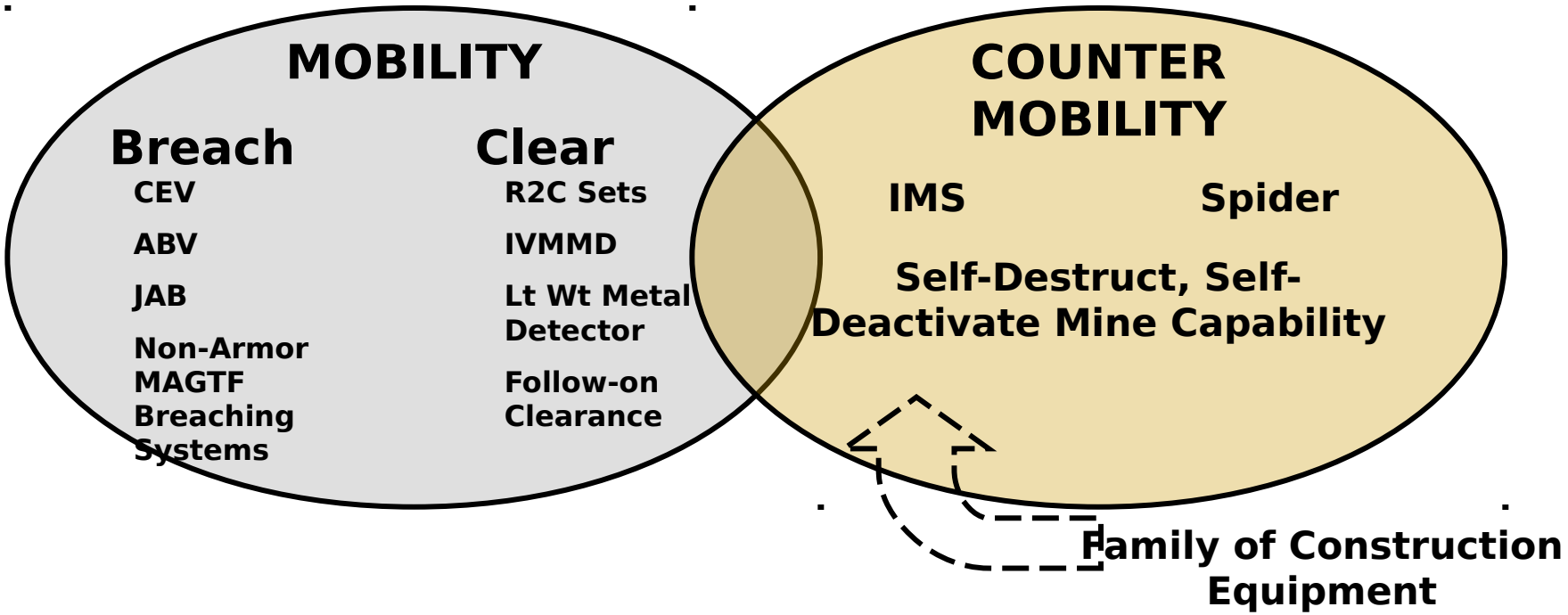
Capability

1. MBT Firepower Enhancement
2. 120MM Tank HE round
3. .50 Caliber Thermal sight
4. Tank Multi-Purpose Blade
5. Tank Rear Sensor
6. EAPU Modification
7. Tank Thermal Management Devices (Shades/Fans)
8. Loader's Remote Weapon Station
9. Tank Systems Improved Reliability and Sustainability (TSIRS)

- Current Program of Record; FOC anticipated FY09
- Responds to UUNS; consistent with tank requirements documentation
  - Plan to evaluate options foreign and domestic
  - Army requirement unfunded (CDD in staffing for Advanced Multipurpose Round)
  - Would like a solution in 18 mo
- Conducted an OSD Quick Response RDT&E plan
  - Developed prototypes
  - Will procure through tank mod line; schedule TBD
- Blades currently in country
  - Additional blades being procured in order to provide training systems in conus; deliveries all in this FY
- Rear sensor and EAPU mod being conducted under OSD Quick Response funding to develop prototype hardware and cover non-recurring engineering. Upon completion in at the end of CY07, anticipate this being funded under the modification line; schedule TBD
- Rapid low cost shade and 24V fans being procured and integrated for contingency support to allay heat concerns (this program can be eliminated from this discussion as the total cost is going to be <$50K, expect to be fielded within 90 days
- Currently adapting OTS hardware to provide prototype. Schedule, funding TBD
- Modifications based on obsolescence of current components and test equipment: funding via FY07 bridge; fielding will take 3 years to complete due to MPS rotation

Engineer – Mobility & Counter Mobility

Engineer Capabilities



Mobility
Breaching

DOTMLPF Impacts

- **Doctrine.**
  - **What published doctrine addresses the capability? Is the published doctrine current?**
    - Combat Engineer Battalion is governed by MCWP 3-17, dtd 14 Feb 2000. This manual is outdated and requires updates based on GWOT lessons learned and current TTPs.
    - Assured mobility doctrine, as written by the Army, addresses gap crossing and IEDs, which are largely ignored in MAGTF Breaching Operations doctrine.

- **Organization**
  - **Assumptions:**
    - Organizational change issues limited to adjustments within existing force structure to accommodate new capabilities.
  - **What organizational changes, if any, will eliminate or mitigate the capability gap?**
    - The CEB is chronically over-tasked, organizational changes associated with these systems can improve the effectiveness of the Battalion, but not eliminate the gap.
    - 202K end strength increase initiative proposes addition of 3d CEB.
    - Fielding ABV, JAB & R2C requires T/O and T/E increase to support Mobile Assault Co w/in CEBs.

DOTMLPF Impacts

- **Training**
  - **How could training be modified or provided to mitigate or eliminate the gap?**
    - Developing publications and POI to support fielding the CEV, ABV, and JAB.
    - Adapt to reflect enhanced CEB mobility.
  - **What training requirements are identified for the fielding of new equipment?**
    - Driver licensing
    - Operator training
    - Maintainer training
    - Incorporation of new equipment and capabilities in T&R manual.
    - Identification of sustainment training requirements and MCBUL 5400 updates as required.
  - **Who can provide the required training?**
    - TECOM; MCES; Ft Leonard Wood; NET Teams

DOTMLPF Impacts

- **Leadership and Education**
  - Leaders have mitigated these gaps and short falls to a limited extent or have accepted a reduced level of capability and the associated risks.

Personnel

- Operator and Maintainer structure growth in Engineer community to accommodate new platforms (e.g., CEV, R2C, ABV, & JAB).
- JAB TOECR – complete
- 202K end strength increase initiative proposes addition of 3d CEB.
- Fielding ABV and JAB requires T/O increase to support Mobile Assault Co w/in CEBs.

- **Facilities**
  - Identified facilities requirements for ABV and JAB in 1st and 2d CEB.
  - Further analysis required to identify CONUS, OCONUS, or theater specific facilities (e.g., ramp space, maintenance bays, etc.) for CEV and R2C capabilities.

DOTLMPF Impacts

- **Materiel**
  - **Are there current materiel solutions available to mitigate the capability gap?**
    - Combat Engineer Vehicle (CEV) (MRAP)
    - Mine Clearing Line Charge System (Mk 154 & 155)
    - Assault Breacher Vehicle (ABV)
    - Joint Assault Bridge (JAB)
    - JDAM Assault Breaching System (JABS)
    - Family of Breaching Systems for Non-Armor MAGTF Units (UNS)
    - Family of Counter Mine, Counter IED, Counter UXO Systems
    - Family of Construction Equipment (M9 ACE replacement/PIP)
    - Family of Engineer Kits (Demo, Recon, Breaching)
    - Standoff Neutralization (MCLIC, APOBS replacement)
  - **Are there any current service/joint solutions available which meets the requested capability? If yes explain.**
    - **Is MC participating in another service's program?**
      - CEV (MRAP), ABV, JAB
    - **Is the MC developing a solution that is independent of other services?**
      - Family of Breaching Systems for Non-Armor MAGTF Units
  - **If new start describe recommended solutions.**
    - MRAP to meet CEV & R2C capability

Anticipated Shortfall in Recovery Capability

Possible Solutions
Non-Materiel/Materiel

Materiel Solutions

- Combat Engineer Vehicle (CEV) (MRAP)
- Mine Clearing Line Charge System (Mk 154 & 155)
- Assault Breacher Vehicle (ABV)
- Joint Assault Bridge (JAB)
- JDAM Assault Breaching System (JABS)
- Family of Breaching Systems for Non-Armor MAGTF Units (UNS)
- Family of Counter Mine, Counter IED, Counter UXO Systems
- Family of Construction Equipment (M9 ACE replacement/PIP)
- Family of Engineer Kits (Demo, Recon, Breaching)
- Standoff Neutralization (MCLIC, APOBS replacement)

- Enhanced breaching capabilities mitigate the Conduct Maneuver, Conduct Offensive Forms of Maneuver, Conduct Mobility Operations, Conduct Offensive Operations, Maintain Mobility, and Conduct Amphibious Raid shortfalls for mobility / counter mobility.

Mobility Clearing

DOTMLPF Impacts

- **Doctrine.**
  - **What published doctrine addresses the capability? Is the published doctrine current?**
    - Combat Engineer Battalion is governed by MCWP 3-17, dtd 14 Feb 2000. This manual is outdated and requires updates based on GWOT lessons learned and current TTPs.
  - **What doctrinal changes result from new/enhanced capabilities being introduced to mitigate this gap?**
    - Developing R2C TTPs
- **Organization**
  - **Assumptions:**
    - Organizational change issues limited to adjustments within existing force structure.
  - **What organizational changes, if any, will eliminate or mitigate the capability gap?**
    - The CEB is chronically over-tasked, organizational changes associated with these systems can improve the effectiveness of the Battalion, but not eliminate the gap.

DOTMLPF Impacts

- **Training**
  - **How could training be modified or provided to mitigate or eliminate the gap?**
    - Developing publications and POI to support fielding the R2C Sets, IVMMD, and Light Weight Metal Detector.
    - Leveraging Joint counter IED training to mitigate current force protection / survivability shortfalls.
    - Leverage use of simulators where appropriate.
  - **What training requirements are identified for the fielding of new equipment?**
    - Driver licensing
    - Operator training
    - Maintainer training
    - AN/PSS-12 and AN/PSS-14 competency verification
  - **Who can provide the required training?**
    - TECOM; MCES; Ft Leonard Wood; NET Teams; Field Service Representatives for R2C Sets

DOTLMPF Impacts

- **Leadership and Education**
  - Leaders have mitigated these gaps and short falls to a limited extent or have accepted a reduced level of capability and the associated risks.

- **Personnel**
  - Operator and Maintainer structure growth in Engineer community to accommodate new platforms (e.g., MRAP/IVMMD R2C Sets).
  - New MOS not anticipated
  - Increase T/O w/in CEBs to offset increased support and equipment demands (i.e., 13 vice 9-man squad).
  - 3d and 4th CEBs

- **Facilities**
  - Further analysis required to identify CONUS, OCONUS, and theater specific facilities (e.g., ramp space, maintenance bays, etc.)

Requirement for 3d/4th CEBs IOT balance MAGTF

DOTMLPF Impacts

- **Materiel**
  - **Are there current materiel solutions available to mitigate the capability gap?**
    - MRAP R2C Sets (JUONS/UUNS)
    - Interim Vehicle Mounted Mine Detection System (IVMMD) (UUNS)
    - Advanced Mine Detector (AMD)
    - Light Weight Metal Detector (UUNS)
    - Navy Assault Breaching System (ABS) (JABS and DARTS)
    - Family of Counter Mine, Counter IED, Counter UXO Systems
    - Assault Follow-on Clearance Capability
  - **Are there any current service/joint solutions available which meets the requested capability? If yes explain.**
    - **Is MC participating in another service's program?**
      - MRAP R2C Sets (JONS/UUNS)
      - IVMMD (UUNS)
      - Advanced Metal Detector (AMD)
      - Family of Mine Clearing Systems (JABS and DARTS)
    - **Is the MC developing a solution that is independent of other services?**
      - Light Weight Metal Detector (UUNS)
  - **If new start describe recommended solutions.**
    - MRAP R2C sets

Possible Solutions
Non-Materiel/Materiel

Materiel Solutions

- MRAP R2C Sets (JUONS/UUNS)
    - Interim Vehicle Mounted Mine Detection System (IVMMD) (UUNS)
    - Advanced Mine Detector (AMD)
    - Light Weight Metal Detector (UUNS)
    - Navy Assault Breaching System (ABS) (JABS and DARTS)
    - Family of Counter Mine, Counter IED, Counter UXO Systems
    - Assault Follow-on Clearance Capability

- Enhanced clearing capabilities mitigate the Conduct Maneuver, Conduct Offensive Forms of Maneuver, Conduct Mobility Operations, Conduct Offensive Operations, Conduct SASO, Maintain Mobility, and Conduct MOOTW shortfalls for mobility / counter mobility.

Counter Mobility

DOTMLPF Impacts

- **Doctrine.**
  - **What published doctrine addresses the capability? Is the published doctrine current?**
    - Combat Engineer Battalion is governed by MCWP 3-17, dtd 14 Feb 2000. This manual is outdated and requires updates based on GWOT lessons learned and current TTPs.
    - Executive Order limits use of non-self destructing mines.
  - **What doctrinal changes result from new/enhanced capabilities being introduced to mitigate this gap?**
    - Adapt to reflect self-destructing, self-deactivating mine requirement post 2010.

- **Organization**
  - **Assumptions:**
    - Organizational change issues limited to adjustments within existing force structure.
  - **What organizational changes, if any, will eliminate or mitigate the capability gap?**
    - The CEB is chronically over-tasked, organizational changes associated with these systems can improve the effectiveness of the Battalion, but not eliminate the gap.

Requirement for 3d/4th CEBs IOT balance MAGTF

DOTMLPF Impacts

- **Training**
  - **How could training be modified or provided to mitigate or eliminate the gap?**
    - Leveraging simulation and training in Joint systems will mitigate, but not close, the post 2010 mine / counter mobility gap.
    - Training on Family of Scatterable Munitions and Joint materiel solutions.
  - **What training requirements are identified for the fielding of new equipment?**
    - Develop publications and POI to support fielding of future self-destructing, self-deactivating mine capability.
  - **Who can provide the required training?**
    - TECOM; MCES; Ft Leonard Wood; NET Teams

DOTMLPF Impacts

- **Leadership and Education**
  - Leadership currently accepting a reduced level of capability and the associated risks. Self-Destructing, Self-Deactivating Mine Capability unfunded in POM 08.

- **Personnel**
  - **Describe personnel changes which can be done to eliminate gap?**
    - None
  - **Can MOS realignment mitigate the gap?**
    - No

- **Facilities**
  - **Describe facility (include MILCON) changes required fully or partially to close the gap?**
    - None
  - **Are there theater facilities required?**
    - No

DOTMLPF Impacts

- **Materiel**
  - **Are there current materiel solutions available to mitigate the capability gap?**
    - Self-Destructing, Self-Deactivating Mine Capability (UNS)
    - Spider
    - Intelligent Munition System (IMS)
    - Potential to leverage Army legacy systems (Volcano or MOPMS) as an interim capability.
  - **Are there any current service/joint solutions available which meets the requested capability? If yes explain.**
    - Spider
    - IMS
  - **If new start describe recommended solutions.**
    - Spider
    - IMS

Possible Solutions
Non-Materiel/Materiel

Materiel Solutions

- Self Destructing, Self Deactivating Mine Capability (UNS)
- Spider
- Intelligent Munition System (IMS)
- Family of Construction Equipment
- Potential to leverage Army legacy systems (Volcano or MOPMS) as an interim capability.

- Counter mobility gap post 2010.
- Enhanced counter mobility capabilities mitigate the Conduct Maneuver, Conduct Mobility Operations, Conduct SASO, Maintain Mobility, and Conduct MOOTW shortfalls in mobility / counter mobility.

Engineer Capabilities Development Activities

Capability

1. ABV (AAO increase)
2. JAB (AAO increase)
3. Family of Engineer Kits (Demo, Recon, Breaching)
4. ACE replacement/PIP
5. Self-Destructing, Self-Deactivating Mine Capability
6. Standoff Neutralization (MCLIC, APOBS replacement)
7. Family of Counter Mine, Counter IED, Counter UXO Systems
8. CEV/R2C sets

CD&I Activity

- Expeditionary Armored Force ICD (3d Qtr 07)
  - ABV OT (2d Qtr 07)
  - JAB CPD (1st Qtr 08)
  - 202 K End Strength Increase
- Family of Engineer Kits
  - Review Army Documentation (3d Qtr 07)
- ACE strategy w/ MCSC (3d Qtr 07)
- Self-Destructing, Self-Deactivating Mine Capability
  - Review Army Documentation (3d Qtr 07)
  - Spider IOT (2d/3d Qtr 07)
- Counter Mine, Counter IED, Counter UXO Capability Materiel Alternatives Workshop (4th Qtr 07)
- MRAP CPD (3d Qtr 07)
  - MRAP Automotive & Live Fire Testing, MRAP LUE
  - Post Conflict Disposition Plan

M/CM Materiel Recommendations

Recommendation: Fund or continue to fund the following programs.

- Expeditionary Fighting Vehicle
- Joint Light Tactical Vehicle
- Marine Personnel Carrier
- Light Armored Vehicle Product Improvements
- Engineer Initiatives
- Amphibious Assault Vehicle Upgrade and Sustainment Initiatives
- M1A1 Firepower Enhancement Program, Upgrade, and Sustainment Initiatives

Engineer

- **ABV (AAO increase)**
- **JAB (AAO increase)**
- **Family of Engineer Kits (Demo, Recon, Breaching)**
- **ACE replacement/PIP**
- **Self-Destructing, Self-Deactivating Mine Capability**
- **Standoff Neutralization (MCLIC, APOBS replacement)**
- **Family of Counter Mine, Counter IED, Counter UXO Systems**
- **CEV/R2C sets**